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B P I S A E

RESEARCH ACTIVITIES

MAR 16 1951

PLEASE CIRCULATE TO ALL INTERESTED EMPLOYEES OF THE BUREAU

PLANT INDUSTRY STATION, BELTSVILLE, MD.

MARCH 1951

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Emphasis on Defense

In considering how the resources of this Bureau can contribute most in the national emergency, first consideration centers on the fact, so well demonstrated in two world wars, that abundant production of essential food and fiber ranks second only to military strength in importance. Much of the Bureau's current research program is vitally important in strengthening and protecting the nation's agricultural production. Obviously, however, some phases of our program have greater significance in relation to defense than others, and these phases need to be emphasized. Moreover, the defense effort brings many problems in agricultural production not important in peace-time, especially problems of adjustment to shortages of certain materials used in production. These must be attacked vigorously. Doubtless, programs for the allocation of fertilizers, pesticides, and other chemicals may be required, and we may be in position to provide necessary factual data and advice needed to make these programs effective.

In addition to lines of work normally encompassed in the Bureau's activities, we are again being called upon by the defense agencies to assist in a good many problems directly related to defense.

We are stepping up the investigations on strategic crops--rubber, hard fibers, tanning materials, and castor beans--initiated some time ago at the request of the Munitions Board.

We have been assigned responsibility for building up the stockpile of guayule seed. Incident to this work we expect to increase as rapidly as possible the new strains that have come out of the breeding program continued since 1942. These yield from 25 to 50 percent more rubber than the best of the guayule produced during World War II. We are also furnishing technical services to PMA in establishing guayule seedling nurseries under irrigation in Southwest Texas. These are designed to provide planting stocks for dry-land production.

At the request of the Reconstruction Finance Corporation we have initiated a program of research on the production of abaca (Manila hemp) in Central America. Bureau scientists are now surveying soils in Costa Rica, Guatemala, and Honduras to find areas best suited to abaca. They are also conducting studies on disease control and cultural practices. Sansevieria, probably the best substitute for abaca, is under study in Florida where Bureau scientists are working on methods for production and processing.

This Bureau is furnishing technical guidance to PMA for a vastly expanded castor bean production in Oklahoma, Texas, and California. We are speeding up our research on the development of adapted varieties and on mechanical harvesters for this crop in the dry-land regions.

The foregoing is only a partial list. There are several others equally important.

In times like this, it is incumbent on all of us that we strive to make our efforts as efficient and effective as possible, keeping in mind the defense needs of the Nation and the important contributions our Bureau can make toward these needs.

Sincerely yours,

Robert M. Salter

Chief of Bureau

Research Attacks Race 15B

Rust race 15B, which broke out for the first time last summer over the Nation's wheat area is the most virulent race of rust ever found in North America. It caused severe losses in North and South Dakota, and was identified in 14 other States. The rust hit the durum wheat crop hardest with losses estimated at \$20 million--more than 20 percent of the crop. Late fields of hard red spring wheat also suffered damage. The 1950 loss was the first serious stem rust damage to spring wheat in 15 years. All present commercial varieties--both spring and winter--are susceptible to the new race 15B.

K.S. Quisenberry (CC&D) outlines the emergency campaign now in progress as follows:

(1) Seed of 590 lines of hybrid materials--durum and hard red spring wheats--is being increased at Brawley, Calif., this winter and will be available for adequate field tests in the spring wheat States this year. Some of the lines are in the sixth and seventh generations and can be released in the near future if they continue to show resistance and are found to be satisfactory in other characteristics such as yield, quality, and stiffness of straw. Most of these strains are selections from crosses involving commercial varieties of hard red spring and durum wheats and those found to be resistant to race 15B in cooperative tests at the University of Minnesota and the Dominion Rust Laboratory at Winnipeg, Canada.

(2) Several of these lines, along with certain varieties from the world collection, were resistant to race 15B and other races in field tests in the spring wheat region in 1950. Additional tests in the greenhouses at Beltsville, Md., St. Paul, Minn., and Winnipeg, Canada, this winter also indicate that several are resistant to 15B. Field tests also are being made this winter in Texas, Florida, Argentina, Chile, Peru, Ecuador, Colombia, and Mexico. H.A. Rodenhiser of the Cereal Division and J.J. Christensen of the University of Minnesota on a recent trip found that some of these varieties and selections were also resistant in the South American plantings.

(3) During the past several years the Bureau's collection of world wheats has been tested under many conditions to select those varieties with resistance to various races of the rusts, mildews and other diseases and insects that commonly attack wheat. Varieties selected in these tests are the parents that transmitted resistance to the promising new lines now being increased in California to get adequate seed for yield and quality trials in the spring wheat area next summer.

(4) One new variety developed by the Rockefeller Foundation, working in cooperation with the Mexican Ministry of Agriculture and now growing on about 500 acres in Mexico, is resistant to race 15B. This variety is being increased by growing two generations a year in order to secure a supply of seed for northern Mexico and southern Texas where stem rust overwinters on wheat. A substantial acreage in resistant varieties in this area should do much to reduce the amount of inoculum and thus give some protection to the main wheat growing areas of the U.S. and Canada.

To solve the problem of rust control through the breeding of resistant wheats will require a long range program with full cooperation between many fields of science. Dr. Quisenberry sees a need to: (1) study the effect of temperature and light on the expression of resistance; (2) determine the relation between seedling and mature plant resistance; (3) locate and transfer to wheat the genes for resistance to rust from related grasses and other species of wheat; (4) continue the search for foreign wheats having other genes for resistance; (5) continue the eradication of the common barberry on which new races of rust may develop.

Effects of 2,4,5-T on Apples and Pears

Fruit set on Bartlett pear trees sprayed with 2,4,5-trichlorophenoxypropionic acid was greater than that of unsprayed trees only when there was no cross-pollination and most of the fruits were produced parthenocarpically. This note comes from L.P. Batjer and M. Nola (F&VC&D) reporting a study of the chemical on apple and pear trees. The findings indicate that orchard spraying affected fruit shape, increased the number of seedless fruits, and resulted in more breakdown and fruit decay. Applied at rates of 25 and 75 parts per million, the spray drastically reduced fruit set on Anjou pears and Delicious and Winesap apples. Maturity was hastened in the few apples that were set.

 * NEW VARIETIES IN 1951 *

Sart, a sorgo for sirup production in Mississippi, is named for the late George B. Sartoris (SPI). It is noteworthy for its tall stalks--12 to 15 feet on good land in a good season--stout stems, high juice and sugar content, and large yields of good quality sirup. Some seed is available for increase this spring and the Mississippi Seed Improvement Association expects to have certified seed in quantity by 1952.

The late maturing variety was originated from seed introduced by Carl O. Grassl (SPI) in 1945. In tests at 5 locations it has yielded an average of about 444 gallons per acre or about 10 percent more than the widely grown Hodo variety. It lodges very little in comparison with Hodo and the White African varieties and it carries resistance to leaf anthracnose and stalk rot. The new sorgo, however, is not resistant to rust and some of the other leaf diseases of the region.

Starr millet, a synthetic variety of cattail (pearl) millet originated by Glenn W. Burton of the Georgia Coastal Plain Experiment Station, is named in honor of the late S. H. Starr, a director of the Station. Approximately 15,000 pounds of certified seed were produced in 1950.

The improved variety comes from material introduced from Russia in 1938. An unusually short plant with a thick mass of leaves was selected for crossing with a broad leafed highly palatable common millet to form the synthetic variety. Starr produces more leaves per stem than common millet. The plants, which seldom grow higher than 6 feet, mature 4 to 6 weeks earlier than the common millets and produce about the same yields per acre.

Starr has proved outstanding in grazing tests. Steers on this new variety have gained 2.2 pounds per day. This is in comparison with a gain of 1.7 pounds per day in steers on common millet and 1.1 pounds in steers grazed on improved pastures. Best forage yields for Starr have come from plantings at the rate of 10 pounds of seed per acre in 30 to 36-inch rows. On Tifton sandy loam 128 pounds of nitrogen per acre tripled the forage yields.

Harbine, a winter barley suitable for combine harvesting will soon be generally available to Oklahoma growers. Seed is now being released through the Oklahoma Crop Improvement Association. Two outstanding characteristics of the new barley are its relatively short, stiff straw and its high test weight. It is a six-rowed, rough awned, small-seeded variety with short, erect heads. In Oklahoma it is medium early, high yielding, and winter hardy. It carries considerable resistance to leaf rust and some resistance to several other leaf diseases and appears highly resistant to five physiologic races of loose smut. Like all other commercial winter barleys tested at the Oklahoma Station, Harbine is susceptible to both cinch bugs and greenbugs. Harbine originated as a selection from Composite Cross C.I. 5530 sent to the Oklahoma Station in Sept. 1930 by the late H.V. Harlan, formerly in charge of barley investigations for this Bureau. The name "Harbine," was derived from the words "Harlan" and "combine."

The Ironsides watermelon has been selected for its outstanding resistance to wilt, early maturity, quality, size, and resistance to sunburn. It was originated in cooperative breeding work by G.K. Parris of the Florida Experiment Station and C.F. Andrus (F&VC&D). The new watermelon comes from a cross between inbred lines of Leesburg and Hawkesbury made at the Charleston laboratory in 1939. Planted on wilt infested soil in Florida, it showed 75 percent survival in 1945 and has continued the good record in subsequent tests. The melon is long and dark green with length-wise ribbing and somewhat tapered ends. The rind is relatively thin, the deep red flesh clearly demarked from the rind, the texture fine, smooth, crisp, and relatively free from stringiness. The seeds are black. Melons of this variety, grown near Leesburg, Fla., weighed from 35 to 42 pounds, shipped well. The new variety appears to have only one weakness, a tendency to hollow-heart. This can be overcome by picking as soon as the melon is ripe.

Burmosa and Redheart are two new Japanese plum varieties released in cooperation with the California Experiment Station. The first has a relatively short chilling requirement, produces large fruit that ships well. The second, which has high chilling requirements appears good for the foothill and Sacramento Valley plum districts. Both the new plums require cross pollination. The Burmosa, a very early variety, is harvested the latter part of May, develops a full pinkish red color after harvest, has been held in shipping tests satisfactorily for about 3 weeks. The Redheart, a mid-season variety, is harvested just after the flesh turns red and a dullish blush develops.

Cherokee (B 61-3) potato is being released jointly by USDA and the Iowa and Indiana Experiment Stations. It is the first improved variety to carry high resistance to both late blight and scab. A mid-season variety, maturing normally about 10 days later than Cobbler, Cherokee has produced high yields and a high percentage of U.S. No.1 potatoes when grown on muck soils. In Iowa tests the 3-year average for Cherokee was 566 bushels per acre of No. 1 tubers in comparison with 461 bushels for Cobbler. The cooking quality is good. Cherokee tubers have been higher in specific gravity than those of Cobbler in each of the 3-year tests in Iowa.

The cross from which Cherokee was selected was made at Beltsville in 1940. Seedlings were grown for increase in Presque Isle, Me., and sent under the number B 61-3 with about 400 other seedling selections to 20 experiment stations. A number of the stations selected B 61-3 for further trial. It has shown promise in extensive tests but particularly for Middle West soils so badly infested with scab organisms that a susceptible variety like the Irish Cobbler can not be profitably grown.

Hoosier Gold, a new yellow sweet corn hybrid of excellent quality, has been released by the Indiana Station. An early midseason hybrid, Hoosier Gold matures from 3 to 5 days earlier than Golden Cross Bantam in a normal season. The new corn is a single cross hybrid produced by controlled cross pollination of 2 inbred strains--C30, released by the Connecticut Station and G8, available from Purdue.

Milestone for Hybrid Onions

Announcement of hybrid onion varieties in many of the 1951 seed catalogs marks another step toward the realization of a research objective first visualized 26 years ago. That is when H.A. Jones (F&VC&D)--then at the California Experiment Station--discovered the first male-sterile onion plant ever to be reported. This led to the origination of hybrids that surpass standard varieties in size, uniformity, and attractiveness.

Reviewing some of the recent advances in cooperative studies which he has led, Dr. Jones says the problem of hybrid seed production has been fairly well solved. The new onions come from small quantities of seed and bulbs of female and maintenance lines released to commercial seedsmen by the Bureau in 1944. Others will soon make their appearance.

A committee representing the American Seed Trade Association, the Experiment Stations, and USDA is preparing a list of recognized hybrid onion varieties with brief descriptions of each.

As to the cost of hybrid onion seed, now quite expensive in some of the listings, Dr. Jones believes it will follow the pattern of hybrid corn seed prices and probably be stabilized at some point between two and three times that of the standard onion varieties.

Yields of the new hybrids, says Dr. Jones, will vary with variety and the location where it is grown. The plant scientists do not have enough data to draw conclusions on this yet. Although 1950 test plots were located in 17 States this past year, it has not been possible to test the hybrids in every district where they can be produced. Growers will need to experiment to find which of the new varieties are adapted and superior to the old types and perform consistently over the years. Hybrids will be improved and it will take years to develop varieties suitable for all districts in which onions are grown.

Dry-Land Farming Research

The results of 40 years of research on dry-land production have taken many of the question marks out of farming in the Northern Great Plains. In around-up of findings at the Belle Fourche Field Station, South Dakota, A. Osenbrug of the Station and O.R. Mathews (Soils) point out that:

Adapted varieties of the major grain and forage crops are now available for the area represented by the Station, where the average rainfall is about 16 inches annually and the frost free growing period 139 days.

Spring and winter wheats are the important cash crops. Barley and oats are important feed grains and produce more pounds to the acre than wheat. Corn yields less grain but gives fairly dependable returns of stover. However, results indicate the new grain sorghum varieties may replace corn on many farms in the area. Forage sorghum has proved the most reliable feed crop.

Strawberry Response to Photoperiod

Nearly 20 years ago two Bureau scientists - G.M. Darrow and G.F. Waldo --showed the interrelationship between the temperature and length of day in breaking dormancy in strawberry plants. Their findings underlined the need for more precise information on the day-length response of commercial strawberry varieties.

These data have recently been made available in research by H.A. Borthwick and M.W. Parker (F&VC&D). Results of photoperiod experiments with 5 major commercial varieties demonstrate that the long days required for abundant runner production can be simulated effectively by the application of 3-hours of light in the middle of the night. This treatment prevents flower formation and promotes growth of long stems and large leaves.

The findings are already being utilized in greenhouse research on strawberries at Beltsville by J.B. Demaree and Don R. Scott. Nurserymen of the Eastern Shore of Maryland believe the light treatment offers a practical method for increasing runner production on nursery stocks in field plantings, particularly on ever-bearing varieties. These are ordinarily difficult to propagate. Another practical use of these treatments may be to stimulate strawberry runner production in outdoor hydroponic beds. One problem reported in Florida plantings of this type has been the difficulty of obtaining good vegetative growth in late fall and midwinter.

Sprayers Should Be Calibrated on the Farm

Calibration of spray equipment by the operator on the farm offers the only accurate, practical way of applying correct amounts of herbicide to weeds in the opinion of R.E. Larson (FM). His studies show that wear on the many parts of the sprayer, the speed at which spraying is done, and the care taken in mixing the herbicide with water all cause variations in spraying rates that can seriously affect the results. The appearance of more low gallonage sprayers and sprays, requiring relatively less water per unit volume of herbicide, greatly increases the chance of mixing error.

Pears Ripened on the Run

Recent tests by W.H. Redit and William Radspinner (F&VC&D) show that the addition of heaters to cars in which Oregon pears are shipped to Eastern markets will ripen the fruit in transit from Chicago and save one handling.

It has been customary to heat the cars only enough to prevent the fruit from freezing. The pears are then ripened in heated rooms at the wholesale market. This may take from 3 to 5 days. Under the plan devised by Redit and Radspinner, ripening takes place on the run from Chicago where heaters are placed in the cars for this purpose. The cost of adding the heaters is considerably less than that of the extra handling required when the fruit is ripened at the wholesale market and the fruit is ready for retail on arrival.

 RETIREMENTS

J.S. Cooley (F&VC&D) retired January 31 after 37 years of service. A native of Middletown, Va., a graduate of Randolph-Macon College and Washington University, Dr. Cooley served on the staff of Virginia Polytechnic Institute before joining USDA in 1914.

His basic research in the physiology of fruits and vegetables after harvest laid the foundation for a number of improvements in storage and shipping practices. One of the best known of these is the use of oiled wrappers for control of apple scald. Dr. Cooley was the first to show that fruitwraps impregnated with copper would prevent the spread of gray mold that causes nest rot in pears. During the past few years his studies have dealt with the curing and storage of sweetpotatoes.

P. Maxwell Lombard (F&VC&D) retired January 31 after 37 years and 9 months of service. A horticulturist, Mr. Lombard came to the Bureau in 1913 from the Vermont Experiment Station where he had served as an assistant horticulturist for two years. He is a graduate of the University of Vermont. Mr. Lombard's research has been concerned with the improvement of potatoes. One of his studies dealt with the effect of spacing seed and the rate of fertilizer on the size and yields of tubers. Much of his research has been conducted at Presque Isle, Maine. He is the author of C-741, "Descriptions of and Key to American Potato Varieties," now in press.

Weed Researcher Cited

The Texas Junior Chamber of Commerce named Dale W. Young (WI) as one of the outstanding young men of the State in 1950. The awards -- a gold key and a certificate -- were made in recognition of his investigations in the chemical control of mesquite and other range weeds.

Salmon Back From Japan

Japan has made notable strides in revamping her agricultural research and establishing an extension service, says C.S. Salmon (CC&D) who returned Feb. 7 from his second tour of duty as agricultural advisor to GHQ-SCAP. Dr. Salmon spent about 6 months in Japan in 1946 making a survey of agricultural research. This and subsequent studies formed the basis for the reorganization of the research program and the establishment of an agricultural extension service. During the past 10 months Dr. Salmon has been in charge of the agricultural research and extension branch of GHQ. He has worked with Japanese agriculturists in developing better relations between the various units and in helping the Japanese to a better understanding of the project leader system used in USDA research. Dr. Salmon says the land reform system inaugurated in 1945, now almost completed, is very well received. The Japanese are especially enthusiastic about their extension service with more than 9,000 farm and home advisors working in it.